REMARKS

Claims 2-6 are pending in this application, of which claims 2-6 have been amended. Claim 1 has been cancelled. No new claims have been added.

The Examiner has indicated that Figs. 5-7 should be labeled as "Prior Art". Accordingly, prints of Figs. 5-7 corrected as such as attached hereto. If approved, these proposed drawing corrections will be incorporated into formal drawings to be filed prior to payment of the Issue Fee.

Claims 1, 2, 4 and 5 stand rejected under 35 USC §102(b) as anticipated by U.S. Patent 5,663,661 to Seats et al. (hereinafter "**Seats et al.**").

Applicants respectfully traverse this rejection.

Seats et al. discloses a multi-color display having a matrix of cells containing an ionizable gas and fluorescent layers (18) that fluoresce with different colors. The display has rows of cathodes (21) and anodes (20) one of each of which is exposed within each cell so that individual cells can be energized. Each cathode (21) has at least one field-emitter (23) which may be either an uncoated cone, a cone coated with a material with a negative electron affinity, such as a diamond film (27), or formed with a negative electron affinity material, such as diamond. Cells may include an aluminum layer (17) and a dielectric layer (16) for reflecting UV and VUV radiation.

The Examiner has urged that molybdenum lower electrodes 21 or reflective layer 19 meet the limitation of "reflection surface" in claims 1 and 2.

There is no suggestion in **Seats et al.** that the molybdenum lower electrode 21 is

reflective, and the reflective layer 19 is on a surface of lower plate 11 which faces away from the display surface.

This is in contrast to the present invention as shown, for example, in Fig. 1, in which the reflection surface 80 is located on a surface of the back glass plate which is opposite of and faces the display surface.

Accordingly, claim 2 has been amended to recite this distinction, and the 35 USC §102(b) rejection of claims 2, 4/2 and 5/2, as amended, should be withdrawn.

Claim 3 stands rejected under 35 USC §103(a) as unpatentable over **Seats et al.** in view of U.S. Patent 5,754,003 to Murai et al. (hereinafter "**Murai et al.**").

Applicants respectfully traverse this rejection.

Murai et al., like **Seats et al.** fails to teach a back glass surface which is opposite of and faces the display surface, as recited in the proposed amendments to claim 2, from which claim 3 depends.

Thus, the 35 USC §103(a) rejection should be withdrawn.

Claim 6 stands rejected under 35 USC §103(a) as unpatentable over **Seats et al.** in view of U.S. Patent 5,561,348 to Schoenbach et al. (hereinafter "**Schoenbach et al.**").

Applicants respectfully traverse this rejection.

Schoenbach et al., like **Seats et al.**, fails to teach a back glass surface which is opposite of and faces the display surface, as recited in the proposed amendments to claim 2, from which claim 6 depends.

Thus, the 35 USC §103(a) rejection should be withdrawn.

In view of the aforementioned amendments and accompanying remarks, claims 2-6, as amended, are in condition for allowance, which action, at an early date, is requested.

Attached hereto is a marked-up version of the changes made to the specification, Abstract and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**."

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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PATENT TRADEMARK OFFICE

Enclosures: Version with markings to show changes made
Request for Approval of Drawing Corrections w/ Figs 5-7 marked in red ink
Substitute Abstract of the Disclosure

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VERSION WITH MARKINGS TO SHOW CHANGES MADE 09/671,742

IN THE ABSTRACT:

Amend the Abstract as follows:

[The] A plasma display device [of the present invention comprises] including a back surface glass plate [60] equipped with discharge electrodes [130] and having electronics connected to the back surface thereof, a front surface glass plate [50] mounted on and opposing to [said] the back surface glass plate via separation walls [70] and having discharge electrodes [120], and luminescent pixels [110] defined by [said] the back surface glass plate [60, said] the separation wall [70] and [said] the front surface glass plate [50]. The back surface glass plate [60] of the luminescent pixel opposite the display surface is formed as a reflection surface [80], and a fluorescent layer [85] is formed on said reflection surface [80].

IN THE SPECIFICATION:

Amend the specification as follows:

Insert on page 1, line 3 the following heading:

BACKGROUND OF THE INVENTION

Paragraph beginning on page 1, line 8 has been amended as follows:

[The] A plasma display device is a flat panel display capable of displaying color images by generating ultraviolet light through high-voltage gas discharge, and lighting fluorescent agents of various colors painted to each pixel within the panel.

Paragraph beginning at page 1, line 19 has been amended as follows:

However, according to the conventional plasma display devices, a beautiful image is provided only when viewed in a dark room. The image provided by the plasma display is not bright enough to be viewed at a bright place, for example, outdoors.

Paragraph beginning at page 1, line 12 has been amended as follows:

High voltage is impressed to electrodes 12 and 14 of the plasma display device formed as explained above, and gas discharge is performed within the discharge space 20 filled with neon gas including argon. Ultraviolet light is generated in each discharge space 20, and causes the fluorescent 17 of the corresponding pixel to glow.

Paragraph beginning at page 2, line 18 has been amended as follows:

One cause of insufficient brightness of the plasma display device is that not all of the visible radiation from the fluorescent caused by the ultraviolet light generated by the gas discharge is radiated toward the display surface or front glass 12. Visible radiation is also radiated toward the back surface glass 11 and the side surfaces (separation walls 15), and perpendicular members (such as glass) absorb the visible radiation.

Paragraph beginning at page 3, line 5 has been amended as follows:

Moreover, many electronics 3 are mounted to the back surface of the display module 10. The heat generated from the display module 10 heats the electronics 3, causing [trouble] problems.

Paragraph beginning at page 3, line 8 has been amended as follows:

This is because the gas discharge and the fluorescent of the display module 10 generates electromagnetic wave [(]energy[)] having various wavelengths, such as ultraviolet, visible radiation, heat [wave] wavelength energy and radio [wave] wavelength energy. The white-colored dielectric layer 18 mounted to the back surface of the module improves the luminance of the display by reflecting the visible radiation (electromagnetic wave having a wavelength of 0.38 - 0.78 micron) generated from the fluorescent. However, the white dielectric layer does not reflect electromagnetic wave energy having a long wavelength (0.78 – 100 micron) [called the] classified as heat wave energy, or radio wave energy (electromagnetic wave energy having a wavelength of 100 micron or greater).

Paragraph beginning at page 3, line 20 has been amended as follows:

Even further, the electromagnetic wave energy that has not been reflected by the dielectric layer is absorbed by the fluorescent, the white-colored dielectric layer 18 formed on the back surface, and the back surface glass plate 11 of the display module 10, and there, the

electromagnetic wave energy is converted into heat energy. The heat energy causes the temperature of the back surface portion of the display module 10 to increase.

Paragraph beginning at page 4, line 6 has been amended as follows:

The present invention [aims at providing] provides a plasma display device having improved luminosity and bright image quality with low power consumption [power], and with reduced electromagnetic wave energy radiated toward the back surface of the display module equipped with electronics converting into heat energy.

Paragraph beginning at page 4, line 11 has been amended as follows:

The plasma display device according to the present invention comprises a display module equipped with an array of luminescent pixels, and electronics connected to the back surface of the display module[;] wherein the front surface of the display module is a display surface, and the surface of the luminescent pixels opposite said display surface is a reflection surface.

Paragraph beginning at page 5, line 21 has been amended as follows:

According to the present invention, the shape of the discharge spaces (luminescent pixels) are changed, and reflection surfaces formed by metal plating and the like are provided to the areas that are expected to reflect the electromagnetic wave. Thereby, any electromagnetic wave energy regardless of [their] its wavelength can be reflected toward the front direction of the pixel

to improve the brightness of the display, and to minimize the radiation of energy toward the back surface of the module.

Paragraph beginning at page 6, line 6 has been amended as follows:

FIG. 1 is an explanatory cross-sectional view showing the structure of a display module of the plasma display device according to the present invention;

FIG. 2 is a perspective view of a display module of the plasma display device according to the present invention;

FIG. 3 is an explanatory cross-sectional view showing another embodiment of the display module;

FIG. 4 is an explanatory cross-sectional view showing another embodiment of the display module;

FIG. 5 is an explanatory view of the structure of a plasma display device of the prior art;

FIG. 6 is an explanatory view of the structure of a display module according to the prior art; and

FIG. 7 is an explanatory view of luminescent pixels.

Paragraph beginning at page 7, line 10 has been amended as follows:

Metal plating treatment is provided to the surface of the dielectric layer 62 covering the back glass plate 60 and the surface of the separation wall 70, thereby forming a reflection surface 80. Further, a fluorescent agent is applied to the reflection surface 80 to form a fluorescent layer

85. In other words, the reflection surface 80 and the fluorescent layer 85 are provided to all inner surfaces of each discharge space 110 except for the display surface near the front glass plate 50.

Paragraph beginning at page 7, line 18 has been amended as follows:

According to the display module 100 formed as explained above, high voltage impressed to the electrodes 120 and electrodes 130 causes discharge to occur within each discharge space 110, and generates ultraviolet light. Ultraviolet [lights] light impinges upon the fluorescent surface 85. The ultraviolet light is reflected by the reflection surface 80, and the reflected ultraviolet light is radiated toward the front glass plate 50 having no reflection surface (in the direction of the display surface).

Paragraph beginning at page 9, line 3 has been amended as follows:

Moreover, the metal-plated reflection surface 80 not only reflects visible light and ultraviolet, but also reflects all electromagnetic wave energy regardless of [their] its wavelength. Visible light energy, electromagnetic wave energy with a long wavelength, and radio wave energy are all reflected by the reflection surface 80, and will not be absorbed by the back surface glass plate 60. As a result, no energy causing a temperature rise will reach the electronics equipped to the back surface of the module.

Paragraph beginning at page 9, line 22 has been amended as follows:

In the present embodiment, the dielectric layer 620 covering the back surface glass plate 60 comprises a concave surface 625 positioned at the center of each discharge space. Sandblasting is applied to the concave surface 625 to form a concave mirror-like surface. Thereafter, metal plating is applied to the concave surface 625 to form a reflection surface 800. Then, a fluorescent agent is applied on the surface of the metal-plated reflection surface 800, forming the fluorescent layer 850.

Paragraph beginning at page 10, line 5 has been amended as follows:

The display module 200 according to the present embodiment is characterized in that the visible light generated by the fluorescent layer 850 is all reflected by the reflection surface 800 having a concave surface, and the light is collected toward the front surface glass plate 50 functioning as the display surface. Therefore, the surface luminance of the display module 200 is improved greatly. Moreover, [since] because the reflection surface 800 having a concave surface reflects all electromagnetic wave energy regardless of [their] its wavelength, so the back surface glass plate 60 will absorb no electromagnetic wave. As a result, the electromagnetic wave energy will not heat the electronics mounted to the back surface glass plate 60.

Paragraph beginning at page 11, line 5 has been amended as follows:

The display module 300 reflects light by a front surface 60a of the back surface glass plate 60. The light transmitted through the back surface glass plate 60 is reflected by the reflection surface 870 toward the display surface or front surface glass plate 50. A portion of the

electromagnetic wave energy absorbed by the back surface glass plate 60 may turn into energy and cause the temperature of the back surface 60b of the back surface glass plate 60 to rise. However, since most of the electromagnetic wave energy absorbed is reflected by the reflection surface 870, the [rising of] temperature rise is [held] limited to a low level. Even further, the module of the present embodiment has a simple structure, and has high [reflect] reflection efficiency.

Paragraph beginning at page 11, line 17 has been amended as follows:

As explained, the display module according to the present embodiment reflects all of the visible light generated by the fluorescent body by the reflection mirror toward the display surface, and improves the luminance of the display surface greatly. Even further, [since] because the reflection surface of the module reflects all electromagnetic wave energy regardless of [their] its wavelength, the temperature of the electronics mounted to the back surface of the module is prevented from rising.

Paragraph beginning at page 11, lien 25 has been amended as follows:

The present invention provides a display module of a plasma display device that solves the problem of heat diffusion of electronics mounted to the back surface of the module, with improved surface luminance, and with a display surface that is bright and provides good image quality, without [rising] increasing consumption power.